

Operating
Instructions

Sinclair Sovereign
sinclair

SOVEREIGN CALCULATOR GENERAL INFORMATION

Battery Installation

The calculator is supplied with two mercury batteries. The battery compartment is located at the bottom of the rear of the case. It is opened by sliding the cover down and off the case body.

Holding the calculator with the back towards you and the battery compartment at the bottom, the battery on the right should have its positive side uppermost whilst the battery on the left its negative side.

The negative side of the battery is the side with the coloured, non metallic ring set into the surface. The positive side is the flat metal surface, usually with printing on it.

Battery Replacement

The batteries need replacement when the display is noticeably dim. The batteries used are 1.35 volt mercury cells. Suitable types are Mallory RM625N or Varta 7002 or any truly equivalent alternative.

Service Tip

Your calculator is designed and manufactured to give you reliable and trouble-free usage. Consequently, very few calculators should need to be returned for repair. As battery problems represent a high proportion of such returns, the following recommendations are made to eliminate the inconvenience of returning your calculator and being without it :-

1. Check and ensure that the battery contacts, both in the body of the calculator and in the battery cover, are clean and bright.
2. Check and ensure that the battery surfaces are clean and free from grease.
3. Try a new fresh set of batteries in your calculator.
4. The batteries should always be removed from the calculator when they

have expired to prevent damage to the machine.

If after following these recommendations your calculator still does not function correctly, return it together with a covering letter to the appropriate Sinclair service department (see Service and Guarantee Section).

OPERATION

ON/OFF Switch

This switch is located in the centre of the lowest row of buttons. Sliding it to the right turns on the calculator and automatically clears it. The calculator is then ready for use.

Display

The calculator has an 8 digit display with a decimal point to the right of each digit. The calculator will accept and display the following range of numbers :-

Any 8 digit positive number
between 0.0000001 and
99,999,999.

Any 7 digit negative number
between -0.000001 and
-9,999,999.

Results or entries greater than these numbers will result in the display flashing, which is the overflow condition, and all keys except the Clear Key (C/CE) are inoperative (see Section on Clear Key). When a negative number is entered, the minus sign will not appear until the next operator is depressed.

Number and Decimal Point Entry

A number is entered by depressing the relevant keys in order of the digits. The decimal point is entered in the correct position as written down. If the decimal point key is operated more than once the last position is the one that will be accepted by the calculator.

For example, to enter 24.6

Keyboard Entry	Display
C/CE	0
2	2
4	24
.	24.
6	24.6

Arithmetic Operations

The Arithmetic Function keys +, -, x and ÷ cause the desired operation to be stored.

Sums are performed exactly as written down on paper. For example, the sum 3 + 7 is performed as follows :-

Keyboard Entry	Display
C/CE	0
3	3
+	3
7	7
=	10.

Chain calculations can be entered in the same way.

To solve the sum $(9 - 4) 5 + 3 =$ the sequence is :-

Keyboard Entry	Display
C/CE	0
9	9
-	9
4	4
X	5.
5	5
+	25.
3	3
÷	28.
7	7
=	4.

In the case of the = key, the sequence can be continued by the use of an operator key.

Automatic Constant

This is a feature whereby a number together with its preceding function may be used repeatedly, for example to calculate 2^5 the sequence is :-

Keyboard Entry	Display
C/CE	0
2	2
X	2 2 ¹
=	4. 2 ²
=	8. 2 ³
=	16. 2 ⁴
=	32. 2 ⁵

Another use is where the number and the function are needed to operate in conjunction with a number of factors. For example, to convert from a large scale to a smaller one, the conversion factor may be 76.2. To use this in conjunction with a lot of measurements the sequence is :-

Keyboard Entry	Display	Note
C/CE	0	
100	100	1st measurement
÷	100	
76.2	76.2	
=	1.3123359	1st dimension
56	56	2nd measurement
=	0.7349081	2nd dimension
317	317	3rd measurement
=	4.1601049	3rd dimension

The sequence of operation is the same with each of the four arithmetic functions.

Percentage

The percent key % just operates as a percentage, i.e. it divides by 100, when it is the next function following a x or ÷. For example, to calculate the annual charge on a loan of £250 at 13.25% :-

Keyboard Entry	Display
C/CE	0
250	250
X	250
13.25	13.25
%	0.1325
=	33.125

When the % key is used as the next function following a + or a - key, it performs an Add-on or Discount calculation automatically. For example, an item costs £25 with 12.5% cash discount and 8% VAT added :-

Keyboard Entry	Display
C/CE	0
25	25
-	25
12.5	12.5
%	3.125
+	21.875
8	8
%	1.75
=	23.625

Square Root

This key performs the dual functions of $\sqrt{\quad}$ and $\sqrt{\quad}^2$.

To find the value of this sum

$$\left[\frac{(7+5)3-4}{4} \right]^{\frac{3}{2}}$$

the sequence is :-

Keyboard Entry	Display
C/CE	0
7	7
+	7
5	5
X	12.
3	3
-	36.

4	4
÷	32.
4	4
X	8.
=	64.
=	512.
√	22.627416

To take the square root of any number it only needs to be entered into the display and then the $\sqrt{}$ key operated.

Shifted Functions

Several of the keys have dual functions. Under normal conditions the function printed on the top of the button is available but if the F key is operated the second function, that printed on the case, is available. Once a function key has been pressed the F key must be operated again to use any other function key.

Square

This is obtained by an operation of the F key followed by an operation of the \cdot key. The key causes the completion of any previously stored function and then squares the result. For example, to find the value of $(3 \times 4)^2$:-

Keyboard Entry	Display
C/CE	0
3	3
X	3
4	4
F	4
\cdot	144

Reciprocal

This is obtained by an operation of the F key followed by an operation of the \div key. The key causes the completion of any previous stored function and then calculates the reciprocal of the result.

To find the value of

$$\frac{1}{3 \times 4}$$

the sequence is :-

Keyboard Entry	Display
C/CE	0
3	3
X	3
4	4
F	4
\div	0.0833333

Memory

The memory is a storage register independent of the rest of the calculator. Information can only be put into the memory from the display and information can only be taken out of the memory into the display.

There are five function keys that operate on the memory. They are all shifted function keys. The memory functions are as follows :-

MC(C/CE)

This key clears the memory register without altering the rest of the calculator. It can be used at any time and in any stage of a calculation sequence without altering that sequence.

M+(+)

This key causes the completion of any stored function. This result is then displayed and also added to the contents of the memory.

M-(-)

This key causes the completion of any stored function. This result is then displayed and also subtracted from the contents of the memory.

MR(=)

This is the Memory Recall key. It overwrites the display with a copy of the memory information without altering the memory.

ME(x)

This key causes the contents of the memory to be written into the display and the contents of the display to be written into the memory without altering either.

If the F key is operated immediately after a function, the contents of the Memory Register are recalled and overwrite the display without the need to use the MR function.

Some of the uses of the memory can be demonstrated in the solution of the following problem :-

$$\left[\frac{7+2+5}{3+4+2} \right] \times 4.5 + (12 \times 14) + (3 \times 8) =$$

Keyboard Entry	Display	Memory
C/CE	0	?
F	0	?
C/CE	0	0
7	7	0
+	7	0
2	2	0
+	9.	0
5	5	0
F	5	0
+	14.	14
C/CE	0	14
3	3	14
+	3	14
4	4	14
+	7.	14
2	2	14
=	9.	14
F	9.	14
X	14.	9
÷	14.	9
F	9.	9
F	9	9
C/CE	9	0
X	1.555555	0
4.5	4.5	0
F	4.5	0
+	6.9999997	6.9999997

12	12	6.9999997
X	12.	6.9999997
14	14	6.9999997
F	14	6.9999997
+	168.	174.99999
3	3	174.99999
X	3.	174.99999
8	8	174.99999
F	8	174.99999
+	24.	198.99999
F	24.	198.99999
=	198.99999	198.99999

Clear

The Clear key performs 3 different functions depending on the state of the calculator. These are :-

1. To clear the calculator, with the exception of the memory, at any time, press the C/CE key twice.
2. To correct a wrong number entry, press the C/CE key once and re-enter the correct entry and proceed with the calculation.
3. To cancel the Overflow condition (the display flashing), press the C/CE key once.

Overflow

The following conditions give rise to the Overflow condition which is when the display flashes :-

1. Any positive sub-total exceeding 8 digits (99,999,999) to the left of the decimal point.
2. Any negative sub-total exceeding 7 digits (-9,999,999) to the left of the decimal point.
3. Any entry greater than 1 which exceeds 8 digits.
4. Any entry less than 1 which exceeds 7 digits.
5. Division by zero.

In each of these cases the Overflow condition can be removed by a single depression of the C/CE key.

If the Overflow was from a sub-total as in cases 1 and 2, the result after the operation of the C/CE key would be 10^8 less than the correct result, i.e. the decimal point should be 8 places to the right of that displayed.

If the Overflow was the result of an extra entry the operation of the C/CE key will remove the Overflow and leave the entry within the specified limits, by ignoring the last digit entered.

If the Overflow was the result of a division by zero the operation of the C/CE key will clear the machine.

Error Correction

If an incorrect entry is made during a chain calculation, it can be corrected by a single operation of the C/CE key followed by the correct entry.

If a decimal point is entered before it should be in a number it can be re-entered in the correct position and the calculator will ignore the first entry.

If a + sign or a — sign operator is pressed in error during a chain calculation, it can be corrected by simply pressing the correct operator. This will set up the correct function ready for the chain to continue. If a 'X' or '÷' sign is pressed in error the calculator must be cleared and the calculation started again.

If a chain calculation is needed to be continued after the operation of the = key it can be by the operation of the next operator. If the = key is followed by a number entry a new chain calculation will be started.

FOR YOUR NOTES :

SERVICE AND GUARANTEE

Your calculator is fully and unconditionally guaranteed for five years from the date of purchase against defects in materials or workmanship. During this period *it will be repaired or replaced (at Manufacturer's Option)* without charge to the owner, when it is returned, carefully packed, *postage pre-paid, preferably* by registered or recorded delivery, to Sinclair. Please enclose a letter clearly stating your name and address, the date and place of purchase, and the nature of the fault. The guarantee is void, if the calculator has been damaged by accident, unreasonable use, neglect or improper service.

Before returning your calculator carefully re-check the instructions and also check that the batteries do not need replacing.

U.K. owners should return their calculator direct to :

**SINCLAIR RADIONICS LIMITED,
CALCULATOR SERVICE DEPT,
LONDON ROAD, ST. IVES,
HUNTINGDON, CAMBS. PE17 4HJ**

Outside the U.K. consult your local Sinclair dealer or distributor.

For your records

Please use the space provided below to record the relevant details for your reference.

Date of purchase

Place of purchase

Owner's name and address

sinclair

Printed in England